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Neighbourhood cohesion and mental wellbeing among older adults: A mixed methods approach

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ABSTRACT

There is now a body of evidence that demonstrates strong links between neighbourhood characteristics and mental health and wellbeing. There is an increasing interest in how this relationship varies for individuals of different ages. Understanding the link between neighbourhood and wellbeing for older adults is of particular significance, given the changing age structure of the population and the desire among policy makers and practitioners to promote healthy and active ageing. This paper provides further evidence on the nature and strength of the link between individual perceptions of neighbourhood belonging and mental wellbeing among those over age fifty using both qualitative and quantitative data from three British cohort studies. Between 2008 and 2011 quantitative data were collected from 10,312 cohort members, and 230 of them took part in qualitative biographical interviews.

Quantitative analysis confirms that there is a moderate association between neighbourhood cohesion and wellbeing measured at the individual level in each of the three cohorts. This association persists after controlling for a range of covariates including personality. The association between neighbourhood cohesion and wellbeing is stronger for individuals in the older two cohorts than in the younger cohort.

Using qualitative biographical interviews with 116 men and 114 women we illustrate how individuals talk about their sense of neighbourhood belonging. The importance of social participation as a mechanism for promoting neighbourhood belonging, and the use of age and life stage as characteristics to describe and define neighbours, is clear. In addition, the qualitative interviews point to the difficulties of using a short battery of questions to capture the varied and multi-dimensional nature of neighbourhood relations.

1. Introduction

There is an increased interest in the association between neighbourhood characteristics and the health and wellbeing of older people. This can be seen in two rather separate strands of literature. First there is a growing body of research in epidemiology on health and place, some of which focuses on the relative salience of neighbourhood for different age groups (Kubzansky et al., 2005; Propper et al., 2005; Fone et al., 2007; Galea et al., 2007; Yen et al., 2009; Cattell, 2012; Julien et al., 2012; Mathias et al., 2012; Dominic et al., 2012). Second there is sociological work, and specifically research within social gerontology that has grown out of the tradition of community studies, that stresses the importance of neighbourhood, and feelings of neighbourhood belonging in shaping the experience of ageing (Phillipson et al., 2000; Scharf et al., 2003, 2005; Krause, 2004; Smith et al., 2004; Phillipson, 2007). A key theme here is the growing heterogeneity of experiences of older people as some have choice over where to live in later life, while others experience marginalisation and alienation as the forces of globalisation change the communities around them and result in a loss of traditional supports (Phillipson, 2007).

A recognition of the importance of place leads to a policy focus on poor places as much as on poor people. In both strands of literature there is an emphasis on the specific importance of the local area for older adults and particularly those who are retired or becoming frail and therefore likely to be spending more time in

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their immediate neighbourhood (Patterson and Chapman, 2004; Michael et al., 2006). Here, we explore the links between wellbeing and perceptions of neighbourhood cohesion in three cohorts – each aged over fifty years.

Much epidemiological research into links between neighbourhood and individual health and wellbeing has focused on objective measures of the neighbourhood (Yen et al., 2009; Bowling et al., 2006). For example, in Britain, some studies link individual survey data to measures of neighbourhood deprivation from the Census and other administrative data, or use ACORN classifications (based on postcode) to characterise the local area. Previous analysis of the Hertfordshire Cohort Study (the oldest of the cohorts included in this paper) found no association between wellbeing and neighbourhood deprivation, measured using the index of multiple deprivation at ward level (Gale et al., 2011). One exception to this focus on objective measures is a study by Bowling et al. on adults over the age of 65 (Bowling et al., 2006; Bowling and Stafford, 2007). Both objective and subjective measures of the neighbourhood were associated with physical and social functioning. For example, a perception of the area as less neighbourly was associated with greater likelihood of low social engagement. This relationship was not attenuated by the inclusion of more objective measures of the local area, and vice versa, suggesting that objective and subjective measures of neighbourhood capture rather different complementary information on the quality of the local environment.

In the sociological and social gerontology literature there has been more of a focus on how social capital, social participation and social cohesion in neighbourhoods may act as protective factors for those living in deprived areas (Cattell, 2004; Smith et al., 2004:Cattell, 2012). It is suggested that a sense of neighbourhood belonging may help provide a positive identity for an older person and that this would help explain the association between neighbourhood cohesion and wellbeing. In the research reported here we therefore concentrate on individual perceptions of neighbourhood cohesion and self-reported wellbeing and capitalise on the fact that we have both qualitative and quantitative data from the same individuals.

Most studies into the relation between neighbourhood and mental health have assessed symptoms of depression or anxiety. Such measures have drawbacks as an indicator of the continuum of mental wellbeing in population samples because the majority of respondents will report no such symptoms. The measure of wellbeing used in the present study – the Warwick-Edinburgh Mental Wellbeing Scale – was developed specifically to measure mental wellbeing in population samples, focussing entirely on positive aspects of mental health (Tennant et al., 2007).

A major advantage of the current study is that equivalent individual-level data on neighbourhood cohesion and on mental wellbeing have been collected in three British cohort studies of older adults (Elliott et al., 2011). This paper exploits the availability of these data first by estimating similar cross-sectional models across the three cohorts and then by using information from qualitative biographical interviews to explore the meaning of neighbourhood cohesion among three age groups.

The research questions were a) to what extent is perceived neighbourhood belonging associated with wellbeing in three separate cohorts of older adults and b) how do older adults conceptualise and talk about neighbourhood belonging in the context of a semi-structured biographical interview. The hypothesis was that the association would be strongest in the oldest cohort where individuals are likely to be spending most time in their neighbourhood. It was also expected that the qualitative material would shed light on the mechanisms underlying links between individual wellbeing and feelings of belonging to a neighbourhood, and whether these vary by age group. A novel aspect of the study is that availability of qualitative and quantitative data present a unique opportunity to combine methods from epidemiology and qualitative sociological research, so that the production of quantitative results is understood alongside an exploration of the meaning of key concepts for the individuals being studied.

2. Methods

HALCyon (Healthy Ageing across the Life Course) is a collaborative research programme using data from nine UK cohorts to examine how factors across the life course influence healthy ageing in older people. This study is based on the three HALCyon cohorts whose members completed questionnaires about mental wellbeing and neighbourhood cohesion and a subsample of each cohort took part in a qualitative biographical interview.

2.1. The Hertfordshire Cohort Study (HCS)

In 1998–2004, men and women born in Hertfordshire between 1931 and 1939 and still living there were recruited to take part in a cohort study to evaluate interactions between the genome, the intrauterine and early postnatal environment, and adult lifestyle in the aetiology of chronic disorders of later life (Syddall et al., 2005) – 3225 people took part. The cohort has been followed up subsequently. Participants completed questionnaires about mental wellbeing and neighbourhood cohesion at a mean age of 73.2 years.

2.2. The MRC National Survey of Health and Development (NSHD)

The MRC National Survey of Health and Development (1946 cohort) grew out of a maternity survey of all mothers who had a baby in England, Scotland, or Wales in one week in March 1946. The cohort was originally based on 5362 participants and has been followed-up through childhood and adult life (Kuh et al., 2011). Participants completed questionnaires about mental wellbeing and neighbourhood cohesion between 60 and 64 years (mean age 63.6 years) before a clinic or home visit.

2.3. The National Child Development Survey (NCDS)

The National Child Development Study (1958 cohort) was originally based on over 17,000 live births in Great Britain during one week in 1958 (Power and Elliott, 2006). The cohort has been followed-up through childhood and adult life. Participants completed questionnaires about mental wellbeing and neighbourhood cohesion at a mean age 50.7 years.

2.4. Mental wellbeing

Wellbeing was assessed using the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) (Tennant et al., 2007). This scale was developed to measure a wide conception of mental wellbeing, including positive affect, psychological functioning (autonomy, competence, self acceptance, personal growth) and interpersonal relationships. It has been validated on a representative general population sample of adults and confirmatory factor analysis suggests it measures a single underlying concept (Tennant et al., 2007). The scale consists of 14 positively-worded statements. Examples include 'I've been feeling interested in other people', 'I've been dealing with problems well', 'I've been feeling good about myself'. For each statement, respondents are asked to indicate which of five options – ranging from none of the time (score 1) to all of the time (score 5) – best describes their experience over the preceding two weeks. The overall score is calculated by summing the scores for

each item. A higher score indicates a higher level of mental wellbeing. A few participants (<1%) had missing data on 1 or more items. The Cronbach alpha for the 14 items in all three cohorts was 0.91, showing high internal consistency.

2.5. Neighbourhood cohesion

Sense of neighbourhood cohesion was assessed using eight items from the 18-item Neighbourhood Cohesion Scale that was developed to measure sense of community and attraction to neighbourhood (Buckner 1988; Lochner et al., 1999). Examples include 'I feel like I belong to this neighbourhood', 'and 'I would be willing to work together with others on something to improve my neighbourhood''. While the measure was initially developed to measure cohesion at the level of the neighbourhood, our sample is not clustered within neighbourhoods and we have treated this measure at the individual level rather than deriving an aggregate measure. Respondents were asked to indicate how strongly they agreed or disagreed with each statement using five response options, ranging from strongly disagree (score 1) to strongly agree (score 5). Examination of the scree slope from a principal components analysis of these eight items in each cohort suggested the presence of a single factor. We calculated an overall score by summing item scores. Higher scores indicate a higher sense of neighbourhood cohesion. The Cronbach alpha of the eight items was 0.86 (HCS and NCDS) or 0.87 (NSHD) showing high internal consistency.

2.6. Covariates

As potential confounders or mediators of the relation between sense of neighbourhood cohesion and mental wellbeing, we chose socio-economic position, whether participants were currently in paid employment or doing regular voluntary work (available for NSHD and NCDS only), presence of a limiting illness or disability, mobility problems, housing tenure, social support, social participation, and the personality traits emotional stability and extraversion. Socio-economic position was defined using occupational social class reported at age 50 (NCDS), age 53 (NSHD), or age 66 years (HCS). Occupations were categorized according to the Registrar General's classification.

Items used to assess mobility problems varied slightly between the cohorts. In HCS, participants were asked how much difficulty they had, or would have, running for a bus or going up or down stairs: no difficulty (0), some difficulty (1), unable to do alone (2). We calculated a mobility score by summing scores on these two items; higher scores indicated greater mobility problems. In NSHD, participants were asked whether they had difficulties going up or down stairs or walking a quarter of a mile: no (0), yes (1). All participants in this cohort who reported difficulties going up or down stairs also had difficulties with walking, so we created a binary variable to indicate presence or absence of mobility problems. In NCDS, participants were asked how limited they were climbing one flight of stairs or walking half a mile: not limited (0), limited a little (1), limited a lot (2). Few participants reported any difficulty with either of these activities, so we created a binary variable to indicate presence or absence of mobility problems.

Social support was assessed differently in the three cohorts. In HCS, participants completed the RAND Social Support Scale which assesses subjective impressions of how frequently different types of social support are available (Sherbourne and Hays, 1990). In NSHD, participants completed two items on social support; one item asked about the frequency with which friends, neighbours, or relatives would help them out if a problem or crisis came up, and the other item asked whether they had enough opportunity to talk openly and share their feelings about things. In NCDS, participants completed five items on social support that asked about the frequency with which they could count on people to help if they were sick in bed, had people around to listen to their problems and feelings, and how often in the last two weeks they had phone or letter contact with friends, had friends to visit or visited friends. We calculated a social support score for each cohort by summing these items; higher scores indicated greater perceived social support.

Social participation was assessed differently in the three cohorts. In HCS, data on social participation was limited to a single binary-response item – whether participants had attended a meeting of a club or society or other organisation in the last month. In NSHD, participants were asked whether in their spare time they were involved in religious groups, job-related associations, recreational groups, civic–political groups, other voluntary work, or other groups or clubs. There were four response options: weekly, monthly, less often, never. In NCDS, participants were shown a card listing 16 types of organisation (for example: political party, residents' association, voluntary service group, sports clubs, religious group). They were asked to indicate whether they were currently a member of any of them, and if so how often they took part in activities. There were four response options: at least once a week, about once a month, less often, never. We calculated social participation scores for NSHD and NCDS by summing scores on the items on frequency of involvement. Higher scores indicated greater social participation.

The personality traits of emotional stability and extraversion were assessed in HCS and NCDS at the same time as mental wellbeing using the relevant items from the IPIP Big-Five Factor Inventory (Goldberg, 2001). In NSHD, neuroticism (the reverse of emotional stability) and extraversion were assessed at age 26 years using the relevant items from Eysenck's short Maudsley Personality Inventory (Eysenck, 1958).

2.7. Statistical analyses

Our analyses are based on 10,312 people – 7581 from NCDS, 1487 from NSHD, and 1244 from HCS – who had complete data on mental wellbeing, neighbourhood cohesion, and all the covariates. These figures represent 78% (NCDS), 76% (NSHD), and 88% (HCS) of the people in each cohort who completed the mental wellbeing items. In NCDS, the measures of wellbeing, neighbourhood belonging, and personality were included in a self-completion paper questionnaire that was sent to cohort members for completion just before the main interview at age 50. A total of 8788 cohort members returned this questionnaire - 90% of the 9790 cohort members who participated in the main age 50 wave of the study (Elliott et al., 2011).

There were no significant differences in mental wellbeing scores between men or women in any of the cohorts – a finding consistent with other studies (Diener, 1984) – and the relation between neighbourhood cohesion and mental wellbeing did not differ significantly between the sexes in any of the cohorts. We therefore analysed men and women together. Within the narrow age ranges in each cohort there was no association between mental wellbeing and age so we did not adjust for age. We used linear regression to examine the association in each cohort between neighbourhood cohesion (expressed as standard deviation (SD) scores) and mental wellbeing, adjusting for the covariates.

2.8. Qualitative interviews and analysis

Biographical qualitative interviews, conducted using a semi-structured topic guide, were carried out with 30 members of HCS, 30 members of NSHD, and 170 members of NCDS in England and

Scotland. The interviews of members of HCS and NSHD were designed specifically for the HALCyon collaborative research programme. Full details, including how the samples were selected, have been published (Elliott et al., 2011). For the present study, data from these interviews have been supplemented by data from interviews with members of NCDS. Members of this cohort took part in a separate qualitative study (Elliott et al., 2010), but responded to the same questions on neighbourhood belonging as were used with members of HCS and NSHD. The biographical interviews were conducted in respondents' homes. With the consent of cohort members each interview was recorded and transcribed for analysis.

We supplement our quantitative data on neighbourhood cohesion by using qualitative information that emerged from responses to two questions: First, 'We know a bit about your housing history from your survey responses but we would like to know a little bit more about your involvement in your current neighbourhood. Can I begin by asking you how long you have lived here and about how you came to live here?'; and second, 'Do you feel you belong here?'.

In order to facilitate analysis, the interview transcripts were uploaded using NVivo9 software. This also made it possible to match variables or 'attributes' collected during the structured quantitative interviews with the biographical interview transcripts. The interview transcripts were serially coded to enable us to extract answers to specific open-ended questions from a number of different interviews. A cross-case analysis was conducted to understand the ways in which cohort members conceptualise and describe their neighbourhood, and to explore possible links to their subjective wellbeing.

3. Results

Table 1 shows the characteristics of individuals in the three cohorts. Scores on mental wellbeing spanned the whole range (14–70) in NCDS and HCS, and a narrower range (18–70) in NSHD. The mean mental wellbeing score was significantly lower in NCDS (mean age 50.7 years) than in the older NSHD and HCS (mean ages 63.5 and 73.2 years, respectively – $p < 0.001$). Participants in NSHD and HCS were more likely than those in NCDS to give a high or even maximum evaluation of neighbourhood cohesion. Consistent with this, mean neighbourhood cohesion scores varied significantly between the cohorts ($p < 0.001$), being highest in HCS and lowest in NCDS.

Table 1
Characteristics of the participants from NCDS, NSHD, and HCS.

	NCDS $n = 7581$	NSHD $n = 1487$	HCS $n = 1244$
Mental wellbeing, mean (SD)	49.7 (7.81)	51.9 (7.83)	51.8 (8.07)
Neighbourhood cohesion, mean (SD)	28.8 (5.34)	31.1 (5.31)	32.1 (4.73)
Female, no (%)	3895 (51.4)	786 (52.5)	609 (49.0)
Age (yr), mean (SD)	50.7 (0.15)	63.5 (0.74)	73.2 (2.47)
Professional or managerial social class	3699 (48.8)	718 (48.3)	448 (36.0)
Doing regular paid or voluntary work	7047 (93.0)	818 (55.0)	–
Tenure of house: own or mortgaged, no (%)	6673 (88.0)	1368 (92.0)	1040 (83.6)
Limiting illness or disability, no (%)	891 (11.8)	343 (23.1)	424 (34.1)
Mobility problems, no (%)	857 (11.3)	234 (15.7)	–
Mobility problem score, median (IQR)	–	–	1 (0–2)
Social support, mean (SD)[a]	14.1 (2.47)	4.67 (0.69)	19.7 (4.64)
Social participation score, median (IQR)[a]	1 (0–3)	2 (0–5)	–
Attended meeting of society/club in last month, no (%)	–	–	869 (70.1)
Emotional stability, mean (SD)			
IPIP	28.7 (7.14)	–	33.6 (7.68)
Maudsley[b]	–	6.20 (3.82)	–
Extraversion, mean (SD)			
IPIP	29.7 (6.61)	–	30.8 (7.03)
Maudsley	–	7.77 (3.13)	–

[a] Social support and social participation were assessed differently in the three cohorts so scores for each are not comparable.
[b] The Maudsley items were coded such that higher scores indicate less emotional stability, i.e. greater neuroticism.

Fig. 1 shows the correlations between mental wellbeing and neighbourhood cohesion in each of the cohorts. The correlation coefficients ranged from 0.41 to 0.21 and were greatest in the oldest cohort, HCS, and lowest in the youngest, NCDS.

Table 2 shows the differences in mental wellbeing score in each cohort for a SD increase in neighbourhood cohesion, unadjusted, adjusted separately for each covariate and then fully adjusted. Adjustment for social class slightly strengthened the association between neighbourhood cohesion and mental wellbeing in all of the cohorts. Adjustment for housing tenure, whether the participants were doing regular paid or voluntary work, mobility problems, limiting illness or disability, or social participation, had only small attenuating effects. More marked attenuation was seen on adjustment for social support and personality traits. After full adjustment for all potential covariates simultaneously, the association between neighbourhood cohesion and mental wellbeing was further attenuated; but it remained statistically significant in all three cohorts. The effect size was largest in the older cohorts: for a SD increase in neighbourhood cohesion, mental wellbeing increased by 1.86 (1.47, 2.25) in NSHD, 1.77 (1.42, 2.12) in HCS, and 0.80 (0.65, 0.94) in NCDS. In other words, for the older two cohorts the increase is approximately one fifth of a standard deviation and one tenth of a standard deviation for NCDS.

4. Selecting individuals for detailed qualitative analysis

To understand more about the ways in which cohort members talk about their neighbourhood and their sense of local cohesion, detailed analysis was carried out on small subsamples of individuals from each of the three cohorts. Our focus was on men and women who had scores at the extremes of the distribution of the quantitative measure of neighbourhood cohesion.

Of the 30 cohort members interviewed from HCS, six of them (5 women (W) and 1 man (M)) scored 38 or over in the neighbourhood cohesion scale. There were six individuals with a neighbourhood cohesion score of 28 or lower (4W and 2M). Of the 29 NSHD cohort members who were interviewed and had valid scores for neighbourhood cohesion, five (3M and 2W) scored 35 or over. Of these, one man and one woman scored the maximum of 40 on the scale. At the other end of the distribution there were six (3M and 3W) who had scores of 27 or less and the lowest score was 20.

Of the 170 individuals who were interviewed from NCDS, there were 10 cohort members (5W and 5M) who had a score of 37 or over, and two men and two women scored the maximum of 40 on the scale. There were 11 (8M and 3W) who had neighbourhood cohesion scores of 21 or less, and the lowest score was 16.

There was considerable consistency between the way that individuals talked about their neighbourhood in the qualitative interviews and responses to questions about neighbourhood cohesion in the questionnaire. In particular those with high scores were extremely positive about their neighbours and stressed that they felt part of the local community. Cohort members used adjectives such as 'lovely', 'excellent', 'very nice', and 'fantastic' to describe their neighbours and made comments such as: 'we've got a good neighbourhood, lots of nice neighbours' or 'Everybody around here's brilliant'. As would be expected, there were far more negative comments about neighbours in the interviews of those who had low cohesion scores. Some of the most extreme included: 'the people above us have been like neighbours from hell', and 'a bunch of bastards really'. However, even those with low neighbourhood cohesion scores had positive things to say about at least

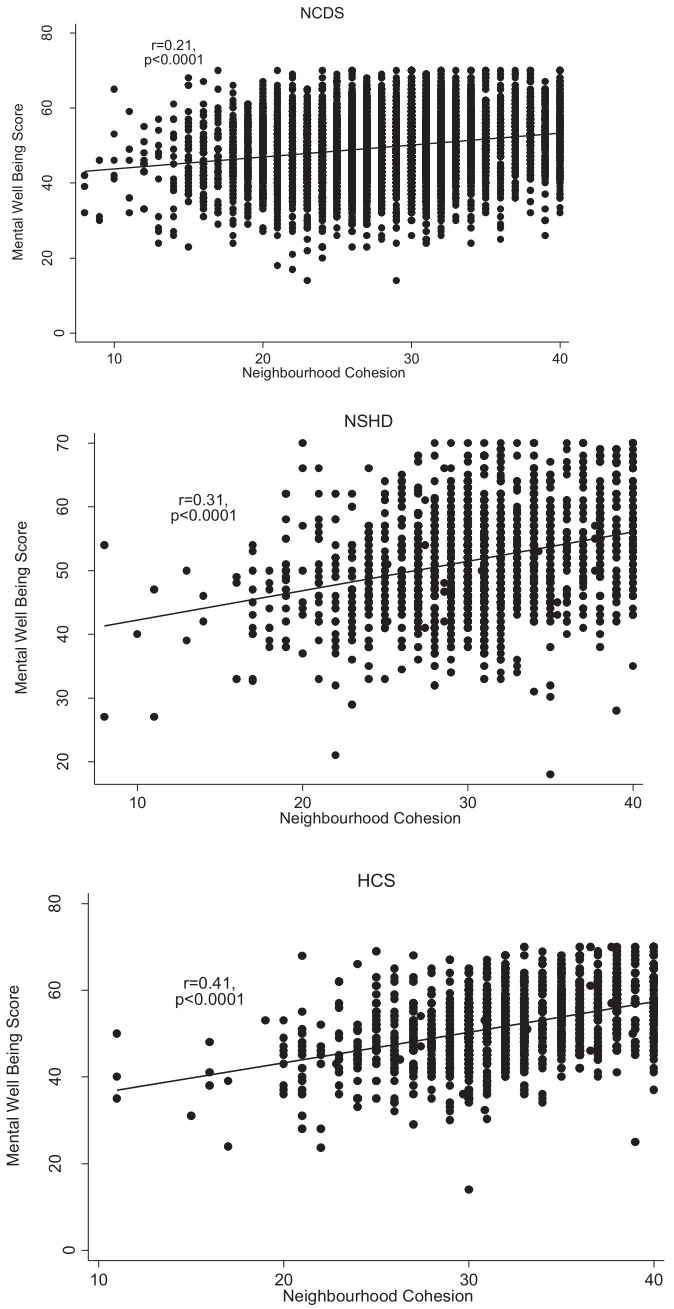

Fig. 1. Correlations between Warwick Edinburgh Mental wellbeing score and neighbourhood cohesion in NCDS, NSHD, and HCS.

some of their neighbours. For example: 'we're very friendly with these neighbours here', and 'We've got good close neighbours'.

Five of the six cohort members in the 'high-neighbourhood-cohesion' group within the HCS mentioned their involvement with several organised social activities and this seemed to enhance their sense that they were part of the local neighbourhood. Organisations mentioned included local neighbourhood watch, yoga, a lunch-club for older people organised by the local chapel, and the local Women's Institute. This suggests that we would also observe an association between social participation and neighbourhood cohesion in the quantitative data, but no data on social participation were available for HCS.

There was also an emphasis on social participation in the qualitative interviews with members of the 1946 cohort. In particular, neighbourhood watch schemes, sport, bridge, and the church were mentioned. The two individuals in this cohort who had the maximum score on the neighbourhood cohesion scale had both lived in their current homes for over thirty years and both were active members of the church as well as participating in other local activities. For example, when D004 was asked 'do you feel part of a community' he responded:

> *Well, I know a lot of people, I'm involved in various things, activities in the town. So I'm very much part of the community, there's no doubt about it. [What sort of activities are you involved in?] I'm involved in the church, I'm involved with the Roundtable, …, er, I'm a Justice of the Peace. (D004; NC score = 40).*

D004 then went on to explain that his daughter and her children live just a few doors away. Similarly the other cohort member (D009) who scored the maximum on neighbourhood cohesion explained that a friend she had known since the early 1960s was her direct next door neighbour. These two examples remind us that there can be an overlap between near neighbours and family or very close friends. There were also several examples of this in HCS. This highlights two aspects of feelings of neighbourhood cohesion: first, active social participation with organised groups in the local area; and second, close interpersonal ties.

Focussing just on the four cohort members (2M, 2F) from NCDS who scored the maximum on the neighbourhood cohesion scale, they each spoke in extremely positive terms about their neighbours and gave examples of practical support:

> *The neighbours are absolutely fantastic, we've got a mixture of middle aged and young–, middle aged, young and old and they're all brilliant. Absolutely tremendous, all keep an eye out for each other. …There was someone out here the other night having a look–, look at the motorbike, five o'clock in the morning, … and the chap over the road saw them and phoned the police and then told us the next morning. …So they all keep–, keep an eye out for each other, it's great (P377).*

Involvement in local groups was mentioned by only one of these four high-scoring cohort members. She explained that she goes to the local church and to the local WI. This respondent also explained that she was in a small group of isolated homes 'on a lane in the middle of fields' but that her brother-in-law lives next door and that they and their two other neighbours shared a common back yard which means that they 'interact quite well', whereas in contrast the two houses at the end of the lane have high fences and are more 'cut off'.

Individuals were heterogeneous in the amount that they talked about neighbourhood and in the way that they conceptualised 'neighbourhood'. For example H028, talked about being part of a parish while another HCS member talked about the village she lives in and how much she has a sense of belonging to that village. Other individuals apparently had a much narrower sense of their neighbourhood and focussed more on describing relations with just the immediate neighbours.

One thing that was striking among those with low neighbourhood cohesion scores is that individuals made relatively few negative comments about their neighbours or their neighbourhoods. This is perhaps consistent with the neighbourhood cohesion scores in the quantitative data given that none of the individuals scored close to the minimum of 8. Interestingly even the cases that have relatively low scores on the neighbourhood cohesion scale often have quite close relationships with at least some of their neighbours. For example, case H011 who openly said 'I'm not a very gregarious person, I don't mix with a lot of people' explained that

Table 2
Difference in mental wellbeing score in NCDS, NSHD and HCS for a standard deviation increase in neighbourhood cohesion. Results are shown unadjusted, adjusted separately for each potential confounding factors, then adjusted simultaneously for all potential confounding factors.

Adjustments	Regression coefficient (95% confidence interval)		
	NCDS ($n = 7581$)	NSHD ($n = 1487$)	HCS ($n = 1244$)
Unadjusted	1.70 (1.53, 1.87)	2.46 (2.08, 2.84)	3.35 (2.94, 3.75)
Adjusted for:			
Social class	1.71 (1.53, 1.88)	2.49 (2.12, 2.87)	3.37 (2.96, 3.65)
Doing regular work	1.72 (1.55, 1.89)	2.52 (2.14, 2.90)	–
Tenure of house	1.67 (1.49, 1.84)	2.43 (2.05, 2.81)	3.32 (2.91, 3.73)
Limiting illness or disability	1.69 (1.52, 1.86)	2.48 (2.11, 2.85)	3.31 (2.91, 3.71)
Mobility problems	1.69 (1.52, 1.86)	2.44 (2.06, 2.81)	3.17 (2.77, 3.57)
Social support	1.34 (1.16, 1.51)	1.90 (1.51, 2.29)	2.74 (2.34, 3.14)
Social participation	1.62 (1.45, 1.79)	2.35 (1,96, 2.74)	3.21 (2.80, 3.63)
Extraversion	1.11 (0.95, 1.27)	2.39 (2.01, 2.76	2.63 (2.22, 3.04)
Neuroticism	1.32 (1.17, 1.46)	2.37 (2.00, 2.75)	2.60 (2.25, 2.95)
All variables	0.80 (0.65, 0.94)	1.86 (1.47, 2.25)	1.77 (1.42, 2.12)

she visits the man who lives next door every day and gives him the newspaper. This perhaps suggests that once close bonds have been formed with individuals they are not necessarily thought of as neighbours, and underlines the difficulty some individuals may have in deciding how to respond to the structured questions on neighbourhood cohesion given that the quality of relationships with different neighbours may be quite distinct.

When more negative themes were present in individual responses these were often linked to the physical structure of the environment at a very local level. For example, one woman (H001) who had lived in the same area all her life talked about the isolation and impact of the main road running through the hamlet. A further example here is H018 who explained that she lived in a very rural area in a group of just seven houses:

> *When we first came and we were new and we had to find out things about the doctor and all the things, I knew the people next door, who were lovely, and the people next door to them, … but they've all gone, … because there's seven houses here and everyone who comes here wants to mind their own business, do you know what I mean? That's the impression I get. And when the children were here and I was busy anyway, and I've got a car—, people come in their cars, really (H018; NC score 26).*

In common with several other interviewees, this cohort member noted a change over time i.e. that there is less cohesion now than in the past and the increased use of the car has reduced social interaction either because of busy roads or because, in comparison with walking, driving reduces opportunities for social interaction at a very local level. This chimes with the sociological literature that highlights perceptions of the decline of community, but also cautions against nostalgia for unproblematically supportive neighbourhoods that may never have existed (Phillipson et al., 2000; Savage et al., 2005; Phillipson, 2007 p 325). There is also an implicit suggestion in this quotation that this individual's neighbours were less important when her children were still living at home. This echoes the results in the quantitative analysis that neighbourhood cohesion appears more salient to wellbeing among older groups.

There was one NSHD member who had a particularly low neighbourhood cohesion score of just 20 (this case is in the bottom five per cent of the distribution of all neighbourhood cohesion scores for this cohort). There were two specific problems experienced by this individual. First, she had a husband with a number of health problems and their marriage had broken down. She and her husband had been under the same roof but living separate lives for over ten years. Second, a dispute with an immediate neighbour had caused considerable tension. This case therefore highlights the complex and stressful experiences of a small minority of individuals.

There were two further NSHD members with relatively low neighbourhood cohesion scores (25 out of 40). While one of these (D010) explained that she didn't feel part of the neighbourhood because she spends many weekends at a second property, the other said that he and his wife would like to move because they were having problems with noisy neighbours:

> *The people above us have been like neighbours from hell. They've put a lot of stress and strain on my wife and I. They are actually renting this place out… we'll probably move when the market is right, when conditions are right. We won't stay here… It's the noise and also the uncertainty… And we're at a stage where we want to get ourselves settled (D012).*

It is striking that this cohort member explicitly states that the noise from the flat above has put a lot of stress and strain on him and his wife. This suggests a mechanism linking low neighbourhood cohesion and low wellbeing. However it also highlights the fact that the neighbourhood cohesion scale does not provide an outlet for individuals to express *problems* with neighbours, rather it is a measure of the strength of positive neighbourhood bonds.

Of the six individuals who scored less than 20 in the neighbourhood cohesion scale from the 1958 cohort, there were two who said little in the qualitative interview about the local area, or who sounded relatively positive about their neighbours. However the other four all talked about specific circumstances consistent with their low neighbourhood belonging scores. For example, the man with the lowest score (of 16) explained that he lived on a very busy road with 'sirens going all night' and 'buses going all day'. He also described one of his neighbours as a recluse (with permanent scaffolding around the house), and the other set of neighbours as 'grumpy'. In contrast to this response, which mainly focussed on structural factors, one of the women with a low score (of 19) was very clear that she didn't 'fit in' with her neighbours. She described them as 'a little bit insular, they socialise with each other and tend to exclude you'. She explained that her neighbours had not liked her husband, and now that she was separated felt that she was different and even a threat to them as couples and that 'there was a point where I felt really excluded, isolated, almost like deliberately left out' (P177). Another cohort member (neighbourhood cohesion score of 19) explained his lack of feeling part of the community 'because I'm not usually here, you know, that often, like I'm working during the day and at weekends I usually go to Edinburgh or something like that. So I never really socialise here I suppose' (p 525). These two examples both demonstrate that high neighbourhood cohesion when viewed at an aggregate level could actually have a negative association or no association with the wellbeing of an individual if that individual feels excluded from the neighbourhood.

5. Discussion: the salience of neighbourhood cohesion for wellbeing

There are perhaps three main ways in which the qualitative material augments and elucidates results of the quantitative analysis. First, the biographical interview material allows us to understand more about how individuals conceptualize their neighbourhoods and their sense of belonging to a community. Second, it allows us to generate and refine ideas about the mechanisms or processes by which neighbourhood cohesion as

measured by a short battery of questions may be linked to individual wellbeing. Third, it potentially suggests reasons why the association between neighbourhood cohesion and wellbeing might be stronger in the older cohorts, even after adjustment for covariates.

Individuals from all three cohorts were generally positive about their neighbourhoods and their neighbours even when they had relatively low scores on the neighbourhood cohesion scale. This is congruent with the quantitative data which shows a skewed distribution for neighbourhood cohesion with only a few participants attaining the minimum, or close to the minimum, score. The examples given by cohort members to demonstrate their close relationships with their neighbours also support the validity of the neighbourhood cohesion scale. They spontaneously talked about how well they know their neighbours and how much they socialise with them, and about the exchange of practical help and support. This clearly links to items such as 'I regularly stop and talk with people in my neighbourhood', and 'I borrow things and exchange favours with my neighbours'. It is also noteworthy that when individuals talked positively about their neighbourhoods they generally talked about the very local area, i.e. the houses that immediately surrounded them.

That said, the responses in the qualitative interviews also underline some of the shortcomings of short batteries of questions as a way of measuring rather complex constructs. For example, it was clear that having a difficult relationship with one neighbour could be extremely stressful but that relations with other neighbours might be good. One problem with the neighbourhood cohesion scale is that it treats neighbours as a homogenous group, whereas, as we demonstrated, individuals may feel very close to some neighbours but have problems with others. In addition some individuals had close family members living nearby, and this also cannot be captured by the neighbourhood cohesion scale. This underlines that the neighbourhood cohesion scale was originally constructed for use with a number of individuals within the same local area so that results could be aggregated to achieve a measure of cohesion at the level of the neighbourhood (Buckner, 1988, 772). The measure clearly has shortcomings as a measure of the individual respondent's orientation to their neighbourhood as it cannot fully capture the diversity of relationships within the neighbourhood.

A further issue concerns the different definitions of neighbourhood used by different individuals with some identifying with a whole parish, village or even feeling an affinity to a major city, while others focussing on immediate neighbours in the same street. Indeed this difference in the 'meaning' of neighbourhood runs even deeper than this. What was noticeable was that some individuals used the term 'neighbours 'to refer to those who lived in close proximity but who were not relations or close friends. Once people living nearby became close confidantes and social supports they stopped being 'neighbours' and started being friends.

However this is not to undermine the value of the quantitative measure of neighbourhood cohesion collected in these three cohorts. Rather it reminds us that we would not expect to see any more than a moderate association between wellbeing and neighbourhood cohesion precisely because of these difficulties in measurement.

5.1. Mechanisms and processes linking neighbourhood cohesion and wellbeing

Very few cohort members made an explicit link between their sense of belonging to their community and their wellbeing. Two isolated examples of this were the cohort member who spoke about the 'stress and strain' of noisy neighbours, and the individual who felt 'excluded and left out' by her neighbours socialising without her. What is striking is that both link problems with neighbours to diminished wellbeing rather than make an association between good relationships with neighbours and enhanced wellbeing.

There were however some common themes in the responses of those with high neighbourhood cohesion scores that provide possible explanations for the links between cohesion and wellbeing. Many such individuals talked about their involvement in locally organised groups and associations. The models presented above suggest that the availability of social support is one of the factors that might link neighbourhood cohesion to wellbeing, but social participation may also be important here. Some of the items in the Warwick Edinburgh wellbeing scale were specifically designed to reflect satisfying interpersonal relationship, such as might be promoted by social participation; for example: 'I've been feeling useful' and 'I've been feeling close to other people'. Indeed as is clear from Cattell's work, well-being can often be seen to have a social conceptualization and relate to mutualisation and enjoying life in the company of others (Cattell, 2012 p 106). Social participation was also found to be linked to neighbourhood cohesion in the quantitative analysis (in NSHD the correlation is 0.23, $p < 0.0001$, in NCDS, 0.13, $p < 0.0001$ no data on this available for HCS). However, it is striking that the inclusion of social participation in the models does not substantially reduce the association between wellbeing and cohesion.

5.2. Age as a moderator of the association between neighbourhood cohesion and wellbeing

The quantitative findings suggest that neighbourhood cohesion is more strongly associated with wellbeing at older ages. Analysis of the qualitative interviews provided some clues as to the possible underlying mechanisms. First those in the older age groups were more likely to talk about the importance of membership of local groups, second there was more mobility and anticipated mobility among the youngest cohort – i.e. they were more likely to have plans for moving, to be travelling some distance to work, or to mention a second home.

It was also noteworthy that in the qualitative interviews one of the key attributes that was used by cohort members to describe their neighbours was age or life stage. Indeed individuals rarely used any other ways of describing individuals except their age or their family configuration. For example: 'That side, when we first came here were an elderly couple, very pleasant, got on fine', 'a youngish man lives next door', and 'an old couple this side, a bit grumpy'. In addition, people often used the age of residents to talk about the area in more general terms; for example: 'this estate doesn't have…family houses I would say, so there are actually quite a lot of people who are downsizing and retiring', and 'Because they're only small cottages you get lots of young couples, they move in for about a year, two years, off they go, so you don't really get to know any of them really'. These comments also highlight the use of life stage as well as age to characterise fellow residents.

6. Study limitations

One limitation of the current research is that although data from three longitudinal studies are used the data are all drawn from a single sweep, such that the longitudinal design is not fully exploited. That said, a strength of the study is that both qualitative and quantitative data and analytic methods are used in tandem; and it should be noted that currently these qualitative materials are only available for a single sweep of each cohort study. In addition, cross-cohort analysis provides a check on the replicability of results; this

can lead to greater confidence in the robustness of findings. The wealth of data also allowed us to explore whether the association between neighbourhood cohesion and positive mental health is mediated or confounded by other factors including socio-economic circumstances, limiting long-term illness or disability, personality, and perceived level of social support. A further limitation is that neighbourhood cohesion and wellbeing are measured in the same respondents and so we do not have an independent neighbourhood-level measure of cohesion.

7. Conclusions

By using data from three British cohorts of adults in later adulthood this paper has demonstrated that there is a robust and moderate association between perceptions of neighbourhood cohesion and mental wellbeing. There is also evidence that the relationship between neighbourhood cohesion and mental wellbeing is somewhat stronger for adults over the age of 65. The use of qualitative interview material, including responses to an open-ended question on neighbourhood belonging, alongside the structured quantitative data provides some additional insights and underlines the affinity between social participation and neighbourhood cohesion. This could either indicate the importance of social participation as a factor enhancing perceptions of neighbourhood belonging or reflect the fact that neighbourhood cohesion facilitates participation in local groups. While the qualitative data do not provide direct insights into the causal mechanisms underlying the results from the quantitative models, they do highlight the way in which those over sixty appear more embedded and settled in their neighbourhoods than those aged over 50 which would be consistent with the finding of a stronger association between wellbeing and neighbourhood cohesion for older adults.

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